IN THE CLAIMS:

1. (Currently Amended) A lithography system for use in optical measurement and/or inspection of sub-surface features in layered media, the system comprising:

an optical multiplexer arranged to project a first optical signal onto a surface;

an output optics unit arranged to receive a second optical signal, the second optical signal resulting from the first optical signal being projected onto the surface; and

one or more optical demultiplexers coupled to receive the second optical signal from the output optics unit, wherein each of the one or more optical demultiplexers includes:

an optical-to-electrical (OE) circuit configured to convert ~~an~~ the second optical signal into a first electrical signal, wherein the optical signal includes a plurality of wavelengths; and

a demodulating circuit, wherein the demodulating circuit is coupled to receive the first electrical signal from the OE circuit and a demodulating signal, and wherein the demodulating circuit is further configured to provide as an output a second electrical signal, wherein the demodulating signal and the second electrical signal each correspond to one of the plurality of wavelengths.

2. (Currently Amended) The lithography system as recited in claim 1, wherein the ~~system further includes an~~ output optics unit ~~coupled to provide the optical signal to the OE circuit, wherein the output optics unit is coupled to receive a beam of light~~ includes an interferometer.

3. (Currently Amended) The lithography system as recited in claim ~~2~~ 1, wherein the second optical signal ~~beam of light~~ is a reflected beam of light.

4. (Currently Amended) The lithography system as recited in claim ~~2~~ 1, wherein the second optical signal ~~beam of light~~ is a diffracted beam of light.

5. (Cancelled).

6. (Currently Amended) The lithography system as recited in claim ~~5~~ 1, ~~wherein the system further includes an optical multiplexer,~~ wherein the optical multiplexer is coupled to receive a plurality of light beams, wherein each of the plurality of light beams has a different wavelength with respect to other ones of the plurality of light beams[[,]].

7. (Currently Amended) The lithography system as recited in claim 6, wherein the optical multiplexer is coupled to a plurality of light sources, wherein each of the plurality of light sources provides one of the plurality of light beams.

8. (Currently Amended) The lithography system as recited in claim 7, wherein each of the plurality of light sources is coupled to a modulator, wherein the modulator is configured to provide a modulating signal.

9. (Currently Amended) The lithography system as recited in claim 7, wherein each of the plurality of light sources is modulated by a directly modulated diode.

10. (Currently Amended) The lithography system as recited in claim 6, wherein the ~~optical multiplexer is positioned to project an incident light beam onto a surface, wherein the incident~~ first optical signal ~~light beam~~ includes wavelengths corresponding to each of the plurality of light beams.

11. (Currently Amended) The lithography system as recited in claim 6, wherein the optical multiplexer performs frequency division multiplexing and the demultiplexer performs frequency division demultiplexing.

12. (Currently Amended) The lithography system as recited in claim 6, wherein the optical multiplexer performs time division multiplexing and the demultiplexer performs time division demultiplexing.

13. (Currently Amended) The lithography system as recited in claim 6, wherein the optical multiplexer performs code division multiplexing and the demultiplexer performs code division demultiplexing.

14. (Cancelled).

15. (Currently Amended) A method for operating a lithography system in order to perform ~~use in~~ optical measurement and/or inspection of sub-surface features in layered media, the method comprising:

projecting a first optical signal onto a surface;

receiving ~~an~~ a second optical signal, the second optical signal resulting from said projecting the first optical signal onto the surface, wherein the second optical signal includes a plurality of wavelengths;

converting the second optical signal into a first electrical signal,

applying a demodulating signal to the first electrical signal; and

producing a second electrical signal responsive to said applying, wherein the second electrical signal corresponds to one of the plurality of wavelengths.

16. (Currently Amended) The method as recited in claim 15, wherein the second optical signal is a reflected beam of light received by an output optics unit coupled to provide the second optical signal to an optical-to-electrical (OE) circuit configured to perform said converting.

17. (Currently Amended) The method as recited in claim 15, wherein the second optical signal is a diffracted beam of light received by an output optics unit coupled to provide the second optical signal to an optical-to-electrical (OE) circuit configured to perform said converting.

18. (Currently Amended) The method as recited in claim 15, further comprising providing the second optical signal to a plurality of OE circuits, wherein each of the OE circuits is coupled to a corresponding one of a plurality of demodulating circuits, ~~and wherein the plurality of OE circuits and the plurality of demodulating circuit form a demultiplexer~~.

19. (Original) The method as recited in claim 18 further comprising providing a plurality of light beams to an optical multiplexer, wherein each of the plurality of light beams has a different wavelength with respect to other ones of the plurality of light beams.

20. (Original) The method as recited in claim 19, wherein each of the plurality of light beams is provided by one of a plurality of light sources.

21. (Original) The method as recited in claim 20 further comprising modulating each of the plurality of light beams with a modulating signal, wherein each of the plurality of light sources is coupled to a modulator configured to provide a modulating signal.

22. (Original) The method as recited in claim 20 further comprising modulating each of the plurality of light beams with a directly modulated diode.

23. (Currently Amended) The method as recited in claim 20, wherein the optical multiplexer is positioned to ~~provide an incident light beam~~ project the first optical signal onto [[a]] the surface, wherein the incident light beam includes wavelengths corresponding to each of the plurality of light beams.

24. (Original) The method as recited in claim 20 further comprising the optical multiplexer performing frequency division multiplexing and the demultiplexer performing frequency division demultiplexing.

25. (Original) The method as recited in claim 20 further comprising the optical multiplexer performing time division multiplexing and the demultiplexer performing time division demultiplexing.

26. (Original) The method as recited in claim 20 further comprising the optical multiplexer performing code division multiplexing and the demultiplexer performing code division demultiplexing.

27-34. (Cancelled).